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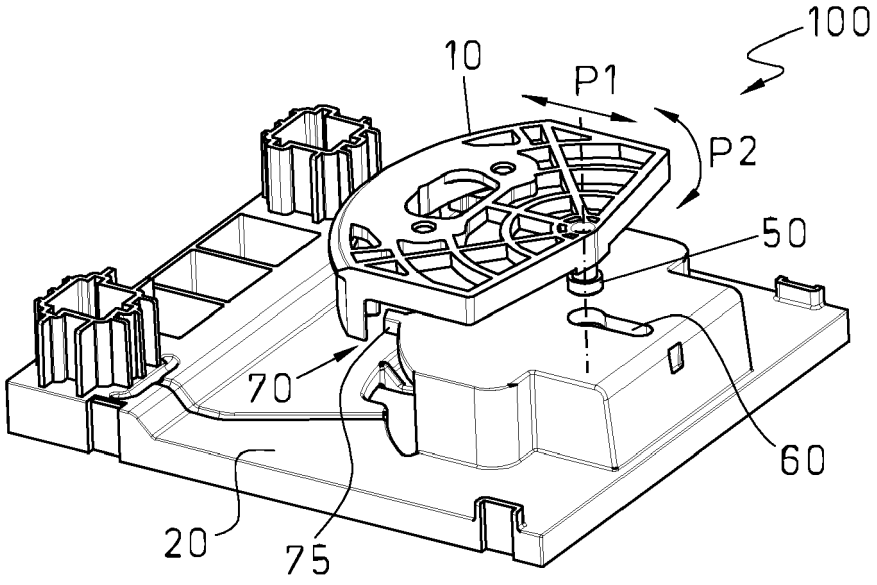
(54) SHIFT BY WIRE SHIFTER DEVICE

(57) The shift by wire shifter device comprises a selector (10) that is movable relative to a fixed part (20) according to a first shifting movement defined by a first shifting path (P1) and according to a second shifting movement defined by a second shifting path (P2) for selecting gearshift positions. One or both shifting paths (P1, P2) extends from different gearshift positions. The selector (10) and the fixed part (20) are directly joined by a joint member (50) such that the first shifting movement is a translational movement and the second shifting movement is a rotational movement, with said first and second shifting paths (P1, P2) lying on the same plane.

FIG.1



EP 3 453 925 A1

Description

[0001] The present disclosure relates to shifter devices comprising a selector movable for selecting different gearshift positions for controlling a vehicle transmission.

BACKGROUND

[0002] Shift by wire shifter devices for electronically controlling a vehicle automatic transmission are known in the art. Such shifter devices are configured to convert a shifting operation when a selector is actuated into an electric shifting signal for controlling a vehicle transmission.

[0003] The selector may be for example a selector lever that can be pivoted for selecting a specific gearshift position. In this case, when certain different operating conditions have to be selected, the shift lever has to be manually move in different shifting channels.

[0004] In other shift by wire shifter devices, the selector may be for example a rotary switch that can be rotated for selecting a specific gearshift position. In this case, when certain different operating conditions have to be selected, the rotary switch can be rotated and also pushed. For example, the rotary switch can be rotated to select reverse and drive gearshift positions, and it can be also pushed for setting and releasing the parking brake.

[0005] US9291259 discloses one example of a rotary shift by wire shifter device where the selector can be rotated and pushed. A return unit is provided that is configured to return the rotary shift to a stable position when it has been rotated from said position. A push restriction unit is configured to restrict pushing and rotation of the rotary shift.

[0006] EP1655516 also shows a shift by wire shifter device for electronically controlling an automatic transmission of a vehicle between a parking state and a shift state. It comprises a shift knob that can be rotated and pushed, a push detecting switch for detecting a pushed state and a non-pushed state of the shift knob, a pop-up tool for popping up the shift knob, and a control unit for controlling an automatic transmission based on the rotated and pushed state of the shift knob or controlling the pop-up tool based on a predetermined operation of the shift knob and the operation of the brake. When the brake is operated by a driver and the push switch is turned on, the actuator lifts up the shift knob.

[0007] There is still a need for shifter devices of the above type whose configuration and structure are highly simplified, with reduced parts involved for reducing manufacturing costs.

SUMMARY

[0008] The present shift by wire shifter device has been shown to solve the above problem while at the same time provides additional advantages.

[0009] The description will be given applied to general shift by wire shifter devices or to the so-called e-shifters for electronically controlling a vehicle transmission. The present shift by wire shifter device can be used in shift by wire shifter devices of the so called multistable type and the monostable type, and also in combinations of said types of shifter devices.

[0010] In multistable shift by wire shifter devices, multiple stable positions are defined for selecting a specific gearshift position. In monostable shift by wire shifter devices, a stable gearshift position is defined into which a selector automatically returns after it has been moved by the user for selecting a specific gearshift position. When such specific gearshift position has been selected, a gearshift signal is sent to a control unit to drive the vehicle transmission accordingly and the selector automatically returns to said stable position.

[0011] The present shift by wire shifter device finds advantageous application in shift by wire shifter devices of the monostable type.

[0012] The selector in the present shift by wire shifter device is movable relative to a fixed part. The fixed part may be formed in or be part of, for example, a shifter device housing. The selector is movably mounted to the fixed part such that it can be moved according to a first shifting movement defined by a first shifting path and according to a second shifting movement defined by a second shifting path for selecting gearshift positions. At least one of said shifting paths extends from different gearshift positions.

[0013] The selector and the fixed part are directly joined by a joint member such that the first shifting movement is a translational movement and the second shifting movement is a rotational movement. The first and second shifting paths that define the above mentioned first and second shifting movements lie on the same plane.

[0014] It may be preferred that at least one of the fixed part and the selector is made of one-piece construction. In one preferred example of the present shift by wire shifter device, the selector is made of one-piece construction.

[0015] The first and second shifting paths intersect with each other. In some cases, intersection between the shifting paths may define a gearshift position. Said gearshift positions may be stable gearshift positions where the selector remains once selected by the user, or it may be a unstable gearshift position into which the selector automatically returns to a stable position once a given gearshift position has been selected by the user.

[0016] It is important to note that the selector and the fixed part are directly joined to each other by a joint member. The joint member may for example comprise a pivot pin projecting from one of the selector and the fixed part. The joint member is intended to slide along a slot formed in the other of the fixed part and the selector as the selector is actuated to perform the first shifting movement. In one example, the pivot pin is formed in or attached to the selector projecting therefrom, and the slot, along which the pivot pin is allowed to slide as the selector is

actuated to perform the first shifting movement, is formed in the fixed part. The pivot pin is also adapted to be rotated in the slot as the selector is actuated to perform the second shifting movement.

[0017] Within the meaning of the present disclosure, the fact that the selector and the fixed part are directly joined to each other means that no other intermediate parts are provided for joining the selector and the fixed part other than the above mentioned joint member.

[0018] The selector and the fixed part are joined such that the first shifting movement is a translational movement defined by the first shifting path and such that the second shifting movement is a rotational movement defined by the second shifting path relative to the position of the joint member. In any case, the particular types of shifting movements that the selector is allowed to perform depend upon the particular configuration of the slot that is formed in the fixed part or the selector.

[0019] The first shifting path P1 may be defined by a straight line although many other path shapes are of course possible. The second shifting path may be defined by a curved line such as, for example, circular, elliptical, oval or a combination thereof. In any case, the first shifting movement and the second shifting movement are performed in the same plane.

[0020] The shifter device may further comprise a feeling element for providing the user with a gear shifting feeling during use, that is, as the selector is actuated. The feeling element has a contoured surface adapted to be contacted by a follower finger. Thus, as the selector is moved to perform at least one of the first shifting movement or the second shifting movement a gear shifting feeling is provided to the user. Said feeling element may be attached to or formed integral with one of the selector and the fixed part. The follower finger may be attached to or formed integral with the other of the selector and the fixed part. In one example, the feeling element may have a first channel adapted to be contacted by the follower finger as the selector is moved to perform the first shifting movement, and a second channel with a contoured surface adapted to be contacted by the follower finger as the selector is moved to perform the second shifting movement.

[0021] Locking means are provided to prevent the selector from being actuated to perform one of the first and second shifting movements when the selector is actuated to perform the other of the first and second shifting movements. In one example, the locking means may comprise a projection formed in one of the selector and the fixed part, and a groove formed in the other of the selector and the fixed part along which the projection can be moved as the selector is actuated to perform the first or the second shifting movement.

[0022] The present shifter device may further include selector position sensing means. The selector position sensing means may be of the magnetic type comprising a lever attached to the selector at one end thereof and a magnet attached to the lever at another end thereof. The selector position sensing means may further include a sensor, such as for example a 3D sensor, located proximate the magnet for determining the position of the selector. In one example, the sensor may be located in the fixed part.

[0023] At least one of the coupling of the lever with the selector and the coupling of the magnet to the fixed part may be through corresponding ball and socket joints. At least one of such ball and socket joints may include an anti-rotation mechanism.

[0024] With a single moving part, that is, the selector, and with a single fixed part, a simple and efficient shifting pattern is obtained, with two different shifting movements of the selector being allowed to efficiently control a vehicle transmission. The present gearshift device is advantageously very simple due to its constructional simplicity and very efficient in use with the position of the selector being accurately determined by using a 3D sensor.

[0025] Additional objects, advantages and features of examples of the present shift by wire shifter device will become apparent to those skilled in the art upon examination of the description, or may be learned by practice thereof.

BRIEF DESCRIPTION OF THE DRAWINGS

[0026] Particular examples of the present shift by wire shifter device will be described in the following by way of non-limiting examples, with reference to the appended drawings, in which:

Figure 1 is a general perspective view of one example of the present shift by wire shifter device;
Figure 2 is a cutaway perspective view of the shift by wire shifter device in figure 1;
Figure 3 is an elevational sectional view of the shift by wire shifter device in figures 1 and 2 taken along line AA in figure 4;
Figure 4 is a top plan view of the shift by wire shifter device in figures 1-3;
Figure 5 is a top sectional view of the shift by wire shifter device in figures 1-4 taken along line BB in figure 3;
Figure 6 is a bottom view of the shift by wire shifter device in figures 1-5; and
Figures 7a-k are graphical schemes showing examples of different patterns according to different relative positions of the shifting movements.

DETAILED DESCRIPTION OF EXAMPLES

[0027] The figures show non-limiting examples of the present shift by wire shifter device 100. In said examples, a monostable shift by wire shifter device 100 has been illustrated. However, the present description may be applied to other types of shifter devices, such as, bi-stable, multi-stable or combinations thereof.

[0028] The present shift by wire shifter device 100 com-

prises a selector 10 that can be actuated by the user for controlling a vehicle transmission. The selector 10 of the shift by wire shifter device 100 is movable relative to a fixed part 20. In the example shown, the fixed part corresponds to a shifter device housing 20. The selector 10 and the housing 20 are both made of one-piece construction in this example.

[0029] The selector 10 is mounted on the housing 20 such that it can be actuated to perform a first shifting movement defined by a first shifting path P1 that is defined by a straight line and also to perform a second shifting movement defined by a second shifting path P2 that is defined by a curved line. Said first and second shifting paths P1, P2 lie on the same plane.

[0030] The second shifting movement according to the second shifting path P2 may be performed when the selector 10 is arranged at the upper end of the first shifting path P1 that defines the first shifting movement P1. Intersection between the first shifting path P1 and a second shifting path P2 is at the upper end of the first shifting path P1 and at an intermediate position of the second shifting path P2, as shown in figure 7a.

[0031] The second shifting movement according to the second shifting path P2 may be performed when the selector 10 is arranged at the upper end of the first shifting path P1. Intersection between the first shifting path P1 and the second shifting path P2 is at the upper end of the first shifting path P1 and at the left end of the second shifting path P2, as shown in figure 7b.

[0032] The second shifting movement according to the second shifting path P2 may be performed when the selector 10 is arranged at the upper end of the first shifting path P1. Intersection between the first shifting path P1 and the second shifting path P2 is at the upper end of the first shifting path P1 and at the right end of the second shifting path P2, as shown in figure 7c.

[0033] The second shifting movement according to the second shifting path P2 may be performed when the selector 10 is arranged at the lower end of the first shifting path P1. Intersection between the first shifting path P1 and the second shifting path P1 is at the lower end of the first shifting path P1 and at an intermediate position of the second shifting path P2, as shown in figure 7d.

[0034] The second shifting movement according to the second shifting path P2 may be performed when the selector 10 is arranged at the lower end of the first shifting path P1. Intersection between the first shifting path P1 and the second shifting path P2 is at the lower end of the first shifting path P1 and at the left end of the second shifting path P2, as shown in figure 7e;

[0035] The second shifting movement according to the second shifting path P2 may be performed when the selector 10 is arranged at the lower end of the first shifting path P1. Intersection between the first shifting path P1 and the second shifting path P2 is at the lower end of the first shifting path P1 and at the right end of the second shifting path P2, as shown in figure 7f.

[0036] The second shifting movement according to the second shifting path P2 may be performed when the selector 10 is arranged at an intermediate position of the first shifting path P1. Intersection between the first shifting path P1 and the second shifting path P2 is at the intermediated position of the first shifting path P1 and at the intermediate position of the second shifting path P2, as shown in figure 7g.

[0037] The second shifting movement according to the second shifting path P2 may be performed when the selector 10 is arranged at an intermediate position of the first shifting path P1. Intersection between the first shifting path P1 and the second shifting path P2 is at the intermediate position of the first shifting path P1 and at the left end of the second shifting path P2, as shown in figure 7h.

[0038] The second shifting movement according to the second shifting path P2 may be performed when the selector 10 is arranged at an intermediate position of the first shifting path P1. Intersection between the first shifting path P1 and the second shifting path P2 is at the intermediate position of the first shifting path P1 and in the right end of the second shifting path P2, as shown in figure 7i.

[0039] Other additional examples of combinations of the first and second shifting movements are shown in figures 7j-7k. However, examples other than those shown in figures 7a-7k for the relative movement of the first and second shifting movements P1, P2 are of course not ruled out.

[0040] The first and second shifting movements are performed by the selector 10 when actuated by the user into different gearshift positions. The first and second shifting movements are performed according to the above-mentioned corresponding paths P1, P2 that intersect with each other in a stable position in the example shown. The selector 10 is mounted to the housing 20 such that it automatically returns to said stable position after it has been moved for selecting one gearshift position. When the desired gearshift position has been selected, a gearshift signal is sent to a control unit to drive the vehicle transmission accordingly.

[0041] The selector 10 and the housing 20 are directly joined to each other, that is, no other intermediate parts are provided for joining the selector 10 and the housing 20 other than a joint member. In the example shown, said joint member comprises a pivot pin 50 formed in the selector 10 projecting therefrom to slide along a slot 60 formed in the housing 20 as the selector 10 is actuated to perform the first shifting movement according to the first shifting path P1. The pivot pin 50 is also adapted to be rotated in the slot 60 as the selector 10 is actuated to perform the second shifting movement according to the second shifting path P2.

[0042] As shown in the drawings and due to the shape of the slot 6, the selector 10 and the shifter device housing 20 are joined such that the first shifting movement is a translational movement defined by the first shifting path P1 as the first shifting path P1 is defined by a straight

line, and such that the second shifting movement is a rotational movement defined by the second shifting path P2 relative to the position of the pivot pin 50 as the second shifting path P2 is defined by a curved line. Examples of other different configurations of the first shifting path P1, such as curved, and of the second shifting path P2 such as circular, elliptical, oval or combinations thereof, are also possible.

[0043] As stated above, the first shifting movement and the second shifting movement, according to their respective paths P1, P2, are performed in the same plane.

[0044] A feeling element 30 is attached to the selector 10 for example through interference fit. The feeling element 30 is configured to provide the user with a gear shifting feeling as the selector 10 is operated for selecting a gear.

[0045] In the non-limiting example shown in the figures of the drawings, the feeling element 30 has a first straight-shaped inner channel and a second arch-shaped inner channel, not shown in the drawings. The first inner channel corresponds to the first shifting movement defined by the first shifting path P1 and the second inner channel corresponds to the second shifting movement defined by the second shifting path P2.

[0046] Both inner channels may define a T-shaped configuration according to the first and second shifting movements defined by the respective paths P1, P2. Other shapes are of course possible.

[0047] The second inner channel of the feeling element 30 has a contoured surface that is adapted to be contacted by a follower finger 40. The follower finger 40 is provided in the housing 20 in such a way that it is biased upwards by a compression spring 45 fitted in the housing 20 as shown in figures 2 and 3 of the drawings. The follower finger 40 is thus biased against a lower portion of the feeling element 30 through the above mentioned second inner channel.

[0048] Thus, the first channel of the feeling element 30 is adapted to be contacted by the follower finger 40 as the selector 10 is actuated to perform the first shifting movement according to the first shifting path P1, and the second inner channel of the feeling element 30 is adapted to be contacted by the follower finger 40 as the selector 10 is actuated to perform the second shifting movement according to the second shifting path P2. In both cases, a gear shifting feeling is provided to the user since some resistance is felt when the selector 10 is actuated.

[0049] Locking means 70 are also provided. The locking means 70 serves the purpose of locking the selector 10 in certain cases. Specifically, the locking means 70 comprise a projection 75 that is formed in the housing 20. The projection 75 is suitable for moving along a groove 76 formed in the selector 10 as the selector 10 is actuated to perform the first shifting movement according to the first shifting path P1. In this way, the locking means 70 prevent the selector 10 from performing one of the first shifting movement and the second shifting movement as it is actuated to perform the other of the first shifting movement and the second shifting movement. For example, the selector 10 is prevented from performing the second shifting movement, that is, from being rotated, as it is displaced, i.e. as it is actuated to perform the first shifting movement. Thus, the movement of the selector 10 relative to the housing 20 is limited by the feeling element 30 with the follower finger 40, the pivot pin 50 and the groove 76.

[0050] Selector position sensing means 80 are also provided in this example, as shown in figures 2 and 3. It may be preferred that they are of the magnetic type. The selector position sensing means 80 comprise a lever 85 that is attached at both ends thereof to the selector 10 and to the housing 20, a magnet 86 that is attached to the lever 85 at a free end thereof, and a 3D sensor 87 that is connected to a PCB and located proximate the magnet 86 for determining the position of the selector 10 when in use. Attachment of the lever 85 to the selector 10 and to the housing 20 may be carried out by respective first and second ball and socket joints 88a, 88b. At least one of such ball and socket joints 88a, 88b includes a protrusion 88c such that the ball and socket joints 88a, 88b are locked against rotation, as shown in figures 2 and 3.

[0051] For controlling a vehicle transmission, the selector 10 can be displaced to perform the first shifting movement according to the first shifting path P1 from the above mentioned stable position, for example, for selecting a neutral N gearshift position. The selector 10 can be also rotated to perform the second shifting movement according to the second shifting path P2 from the stable position, for example, for selecting a reverse R gearshift position or a drive D gearshift position. Other gearshift positions are also possible depending upon the design of the shifter device and the different patterns as shown in figures 7a-k. The 3D sensor 87 of the selector position sensing means 80 determines the position of the selector 10 in the housing 20 and a signal can be output to a vehicle gearbox for controlling the vehicle transmission.

[0052] As stated above, the first and second shifting movements of the selector 10 are performed in the same plane, and they are performed with only a single movable part, i.e. the selector 10, that is joined to a fixed part, i.e. the housing 20 with no moving parts involved in the relative movement other than the pivot pin 50. As a result, a simple and efficient shift by wire shifter device 1 is obtained with two different movements of the selector 10 to efficiently control a vehicle transmission.

[0053] Although only a number of particular embodiments and examples of the present shift by wire shifter device have been disclosed herein, it will be understood by those skilled in the art that other alternative examples and/or uses and obvious modifications and equivalents thereof are possible. Furthermore, the present disclosure covers all possible combinations of the particular examples described. Thus, the scope of the present disclosure should not be limited by particular examples, but should be determined only by a fair reading of the claims that

follow.

[0054] Reference signs related to drawings and placed in parentheses in a claim, are solely for attempting to increase the intelligibility of the claim, and shall not be construed as limiting the scope of the claim.

Claims

1. Shift by wire shifter device (1) for controlling a vehicle transmission, the device (1) comprising a selector (10) that is movable relative to a fixed part (20) according to a first shifting movement defined by a first shifting path (P1) and according to a second shifting movement defined by a second shifting path (P2) for selecting gearshift positions, at least one of said shifting paths (P1, P2) extending from different gearshift positions, wherein the selector (10) and the fixed part (20) are directly joined by a joint member (50) such that the first shifting movement is a translational movement and the second shifting movement is a rotational movement, with said first and second shifting paths (P1, P2) lying on the same plane.

2. The shifter device (1) of claim 1, wherein said first and second shifting paths (P1, P2) define a stable position into which the selector (1) automatically returns after it has been moved for selecting one of said gearshift positions.

3. The shifter device (1) of claim 1 or claim 2, wherein it further comprises a feeling element (30) having a contoured surface adapted to be contacted by a follower finger (40) such that as the selector (1) is actuated to perform at least one of the first or second shifting movements a gear shifting feeling is provided.

4. The shifter device (1) of claim 3, wherein the feeling element (30) is attached to or formed integral with one of the selector (10) and the fixed part (20), and the follower finger (40) is attached to or formed integral with the other of the selector (10) and the fixed part (20).

5. The shifter device (1) of claim 3 or 4, wherein the feeling element (30) comprises a first channel adapted to be contacted by the follower finger (40) as the selector (10) is actuated to perform the first shifting movement, and a second channel with a contoured surface adapted to be contacted by the follower finger (40) as the selector (10) is actuated to perform the second shifting movement.

6. The shifter device (1) of any of the preceding claims, wherein the joint member (50) comprises a pivot pin projecting from one of the selector (10) and the fixed part (20) intended to slide along a slot (60) formed in the other of the fixed part (20) and the selector (10) as the selector (10) is actuated to perform the first shifting movement, the pivot pin (50) being also adapted to be rotated in the slot (60) as the selector (10) is actuated to perform the second shifting movement.

7. The shifter device (1) of any of the preceding claims, wherein it further comprises locking means (70) configured to prevent the selector (10) from being actuated to perform one of the first and second shifting movements when the selector (10) is actuated to perform the other of the first and second shifting movements.

8. The shifter device (1) of claim 7, wherein the locking means (70) comprise a projection (75) formed in one of the fixed part (20) and the selector (10) and a groove (76) formed in the other of the fixed part (20) and the selector (10) along which the projection (75) can be moved as the selector (10) is actuated to perform the first shifting movement defined by the first shifting path (P1).

9. The shifter device (1) of any of the preceding claims, wherein the second shifting path (P2) is defined by a path selected from circular, elliptical and oval. I .

10. The shifter device (1) of any of the preceding claims, wherein the fixed part (20) is formed in or is part of a shifter device housing.

11. The shifter device (1) of any of the preceding claims, wherein at least one of the fixed part (20) and the selector (10) is made of one-piece construction.

12. The shifter device (1) of any of the preceding claims, wherein it further includes selector position sensing means (80) comprising a lever (85) attached to the selector (10) at one end thereof and a magnet (86) attached to the lever (85) at another end thereof, and a sensor (87) located proximate the magnet (86) for determining the position of the selector (10).

13. The shifter device (1) of claim 12, wherein the sensor (87) is a 3D sensor.

14. The shifter device (1) of claim 12 or 13, wherein it a ball and socket joint (88) is provided for coupling of at least one of the lever (85) to the selector (10) and the magnet (86) to the fixed part (20).

15. The shifter device (1) of claim 14, wherein at least one ball and socket joint (88) includes an anti-rotation mechanism.

FIG.1

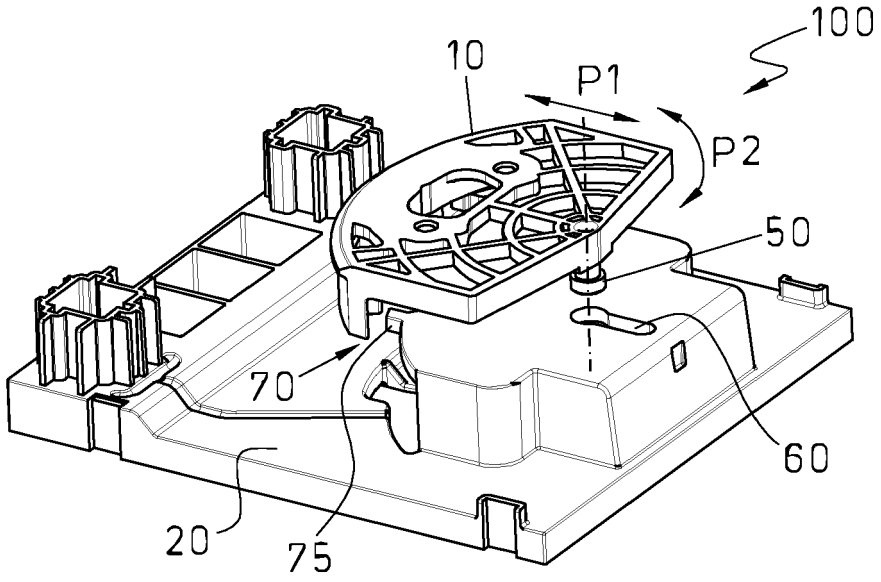

100
10
P1
P2
50
70
60
20
75

FIG.2

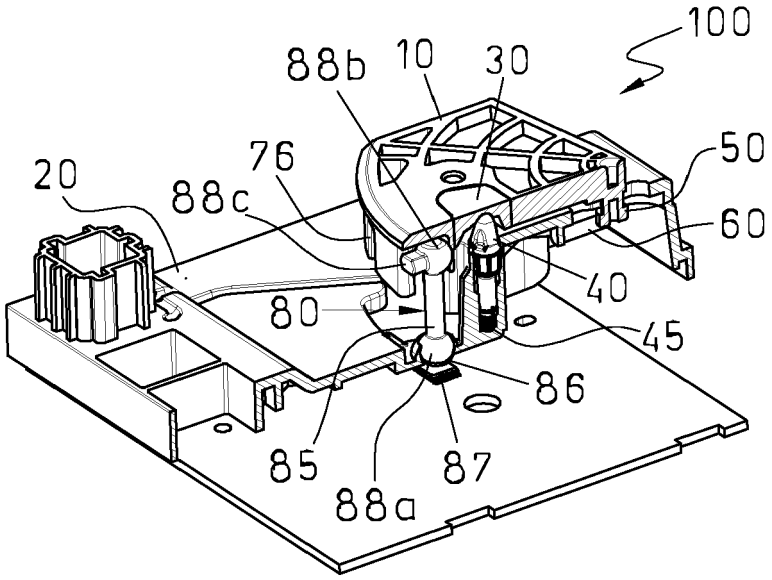

100
88b
10
30
50
76
20
88c
60
40
80
45
86
85
87
88a

FIG.3

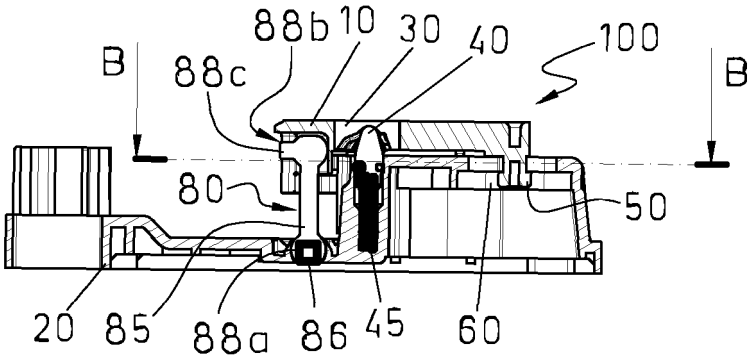

88b
10
30
40
100
B
88c
B
80
50
20
85
88a
86
45
60

FIG.4

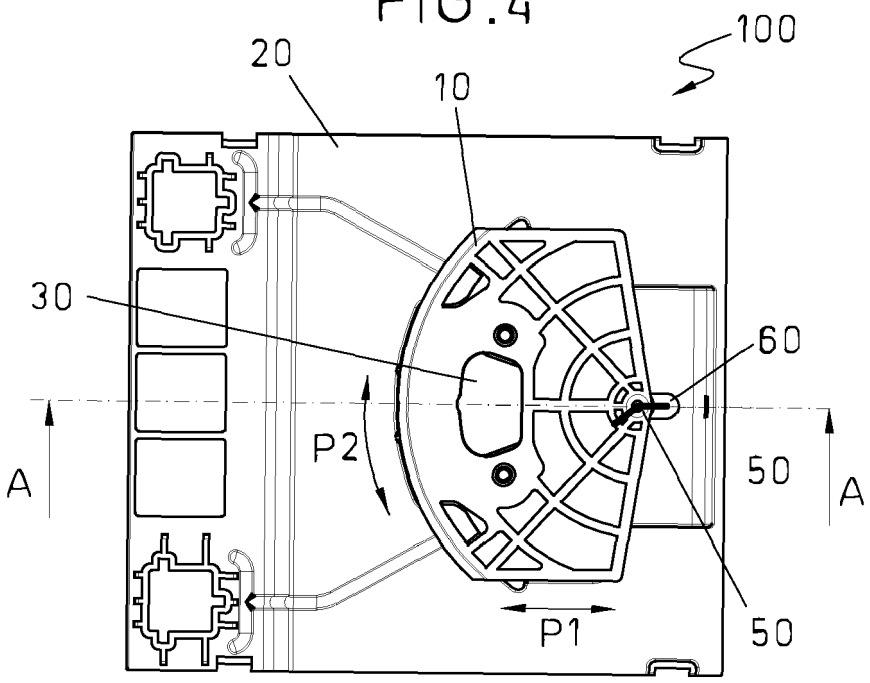

100
20
10
30
60
P2
A
50
A
P1
50

FIG.5

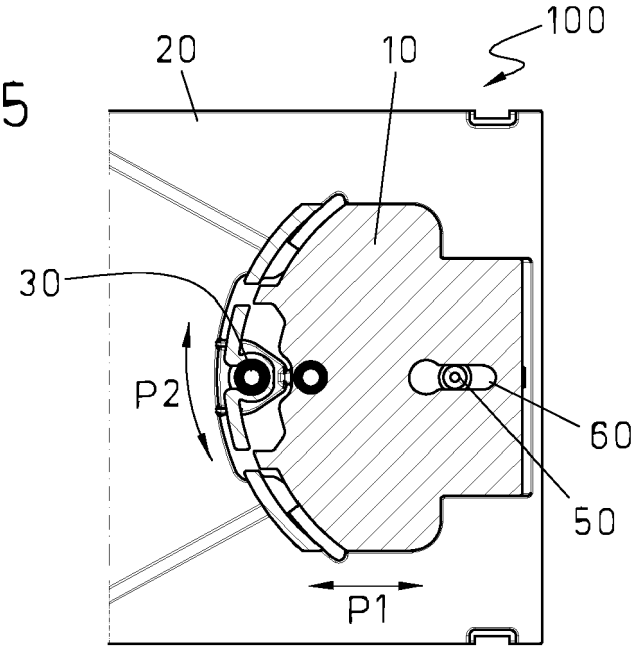


FIG.6

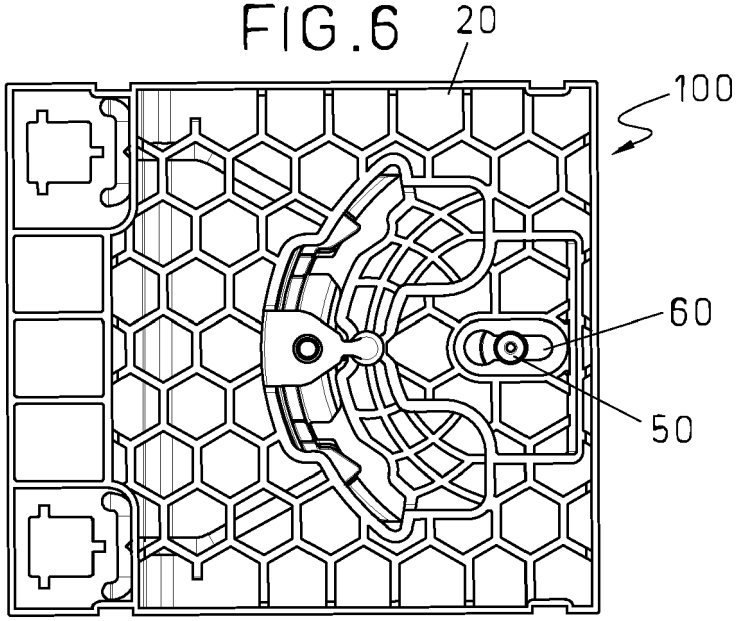


FIG.7a

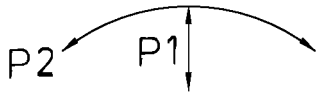


FIG.7b

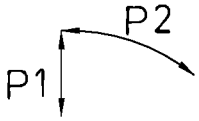


FIG.7c

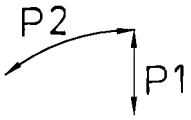


FIG.7d

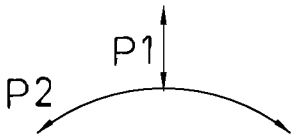


FIG.7e

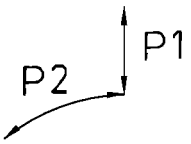


FIG.7f

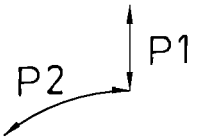


FIG.7g

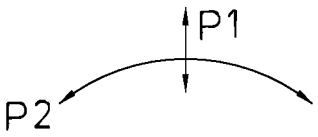


FIG.7h

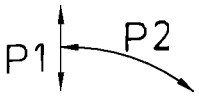


FIG.7i

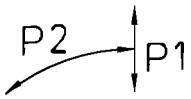


FIG.7j

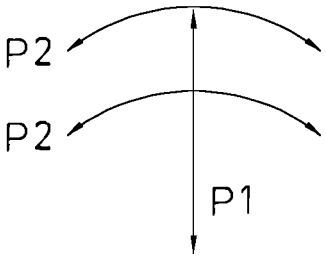
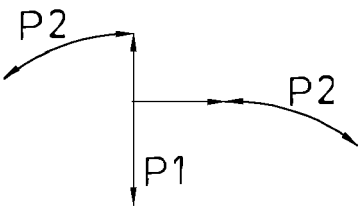


FIG.7k



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EUROPEAN SEARCH REPORT

Application Number
EP 17 38 2600

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~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
Munich	23 May 2018	Werner, Michael

CATEGORY OF CITED DOCUMENTS

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EUROPEAN SEARCH REPORT

Application Number
EP 17 38 2600

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~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
Munich	23 May 2018	Werner, Michael

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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Application Number
EP 17 38 2600

CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

[X] Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

[ ] No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

[ ] All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

[ ] As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

[X] Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

1-6, 9-15

[ ] None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

[ ] The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 17 38 2600

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1, 2, 6, 9-15

   Shift by wire shifter device;

1.1. claims: 1, 2, 9

   Shift by wire shifter device wherein the invention relates to a first and second shifting path;

1.2. claims: 6, 10, 11

   Shift by wire shifter device wherein the invention relates to the constructive design of the fixed part and the selector;

1.3. claims: 12-15

   Shift by wire shifter device wherein the invention relates to selector position sensing means;

   ---

2. claims: 3-5

   Shift by wire shifter device wherein the invention relates to a feeling element so that gear shifting feeling is provided;

   ---

3. claims: 7, 8

   Shift by wire shifter device wherein the invention relates to locking means for preventing the selector from being actuated;

Please note that all inventions mentioned under item 1, although not necessarily linked by a common inventive concept, could be searched without effort justifying an additional fee.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 17 38 2600

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